

The Canadian Entomologist.

VOL. XXIII.

LONDON, MARCH, 1891.

No. 3.

REMARKS ON PROF. JOHN B. SMITH'S REVISION OF THE GENUS AGROTIS.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

To the great kindness of Prof. French I owe a copy of the Bulletin of the U. S. National Museum No 38, which contains Prof. Smith's Revision of the North American Species of *Agrotis*. In view of the fact that out of the 252 species reviewed by Prof. Smith, no less than 110 are credited to myself, besides five species "not placed," it might be reasonably supposed that I was interested to receive this publication and that I must regret not having received it before publishing my New Check List.

With regard to the classification of the group it is conducted upon the basis first suggested by myself, *i. e.*, the forms with unarmed fore tibiae are separated, and other divisions are based upon genitalia and sexual characters. These latter, in my opinion, are not sufficient for generic distinctions in the noctuidæ, and we may thus regard the whole as forming one genus, the more so as the European species are not fully drawn into comparison. Prof. Smith is quite right in saying that I had no idea of the extent of my genus *Carneades*. I only regard as belonging to it species with tuberculated clypeus. At the time of establishing the genus upon *moerens* and *citricolor*, I had no longer the opportunity of comparing my former material. I believe there can only be a question of three genera at the expense of *Agrotis* as considered by modern authorities: one in which the anterior tibiae are unarmed; one in which the tibiae are all armed, both of these with smooth clypeus; the third (*Carneades* Grote) in which the front is tuberculate. I do not know that the generic term *Noctua* can be used for any of these divisions, according to the rules of zoological nomenclature, because I believe it was previously used in the Birds. For the characters to be used in separating the groups of *Agrotis*, I refer the student to my paper on the genus in the CANADIAN ENTOMOLOGIST, Vol. XV., p. 51, *et seq.* The type of the genus, as pointed out by me, is assumed by Prof. Smith to be the European *segetum*.

I referred, in my Check List, *Pachnobia* to *Agrotis* (1875), but in deference to European writers have lately left it near *Taeniocampa*.

The synonymy of the species adopted by the author is largely that previously adopted by myself. It must be held in mind that, in those years, material had not largely accumulated, and that my descriptions were often drawn up from single examples. I am not surprised that certain forms should be now found connected which I was warranted in separating at the time. Indeed I have myself expressed the opinion. In some cases, as *A. janualis*, where it is not done, I think the varietal term should have been kept by Prof. Smith; colour is also a character, and my *var. atropurpurea* of *tessellata* is called a "pure synonym," although based upon a difference in shading which is acknowledged to exist. It is probable that here and there some references have been made which will need correction. Among these is *Agrotis clodiana*, which I think will prove different from *vancouverensis* Grt., while my figure in the Illustrated Essay does not merit, I feel sure, Prof. Smith's criticism upon it. But I may pass over this, as well as other points, to notice a few which should not be passed over. That Mr. Morrison sent me specimens not in accord with his types, I have already stated. To this fact differences in my determinations may in part be due. Mr. Morrison sent me specimens of *Pachnobia carnea* from Mt. Washington labelled *scropulana* "type." I did not know *Wockei*, except from Moeschler's figure (which Prof. Smith says is really *scropulana*), nor did Mr. Morrison. But I had specimens from Mr. Moeschler labelled *Pachnobia carnea* from Labrador which were evidently the same as Mr. Morrison's "types," or so-called types, of *scropulana*. I exhibited the specimens before the American Association as well as the examples of *opipara* Morr. and *islandica* Moesch., which latter were also the same species. I am the first to suggest that *islandica* Moeschl. is not the same as *islandica* Stdgr., and, in consequence, to propose to call the American (Labrador and Mt. Washington) species *opipara* Morr. This view is taken now by Prof. Smith, who has adopted many of my views, but I am brought in by him for an incorrect identification of *islandica* which I never committed. It is I who corrected both Moeschler and Packard for improper identifications of *islandica* as an American species. The identification of these Labrador and Mount Washington species is interesting, as illustrating further the theory advocated in my paper on "The White Mountain Butterfly" of geographical distribution in the North American Lepidoptera. With regard to the erroneous determina-

tion of the European *Dahlia*, I may say that Mr. Morrison himself sent me *phyllophora* determined as *Dahlia* var. of Gueneé, and that I corrected this determination. I may say, to conclude with Mr. Morrison, that sometime after the circumstances which led to our difference transpired, Mr. Morrison wrote me a letter in which he acknowledged that he had misled me on several occasions, for the reason that he imagined I had acted in bad faith to him in sending him (at his request) species to describe, which he thought I knew not to be new. These species *were*, however, really new, and I described them, upon Mr. Morrison's refusal, myself, whereupon Mr. Morrison candidly acknowledged his suspicions, of which he relieved me, and this matter brought our correspondence to a close. With reference to the remarks on page 38, with regard to Mr. Henry Edwards's types of *Agrotis*, I would say that I returned the types of *A. niveivenosa*, *A. pallidicollis* and *A. milleri* to Mr. Edwards, and that I did so at his special request. No other "types" were "borrowed" by me, and all other specimens of *Agrotis* received by me from this source were given to me by Mr. Edwards, as a due return for my general determinations of his material in the family. I relinquished to Mr. Edwards really valuable and veritable "types" of *Aegeriadae* in the exercise of a like courtesy, as Mr. Edwards was studying that group. Mr. Edwards's specimens of Californian *Agrotis* were, however, not "types" until worked over by me, and had little value aside from my work upon them. I gave Prof. Smith also several types of *Noctuidae* and Mr. Neumoegen of *Ardia*. I may here remark that Prof. Smith is fond of citing specimens determined by me which are in various collections and do not belong to my species. In some few cases, as in the *exsertistigma* group, these determinations may well be the result of error on my part. But in by far the greater number of cases I believe that the determinations were not positively made by me, that in all, or nearly all, of them I never compared the specimens with my types or had the opportunity of doing so. Names given by me under a reservation would not unlikely be used by the owner of the specimen without that reservation. I think, when my types come to be examined that *A. orbis* will be shown to be distinct from *cupidissima*, and probably the species described by Prof. Smith under the latter title. But on the whole, and granting all that can be said, and while I am certainly not directly responsible for all the mistakes in the different private collections cited by Prof. Smith, which I have never had the opportunity thoroughly to see, much less to study, it must

be clear to the unprejudiced reader that I have made very few mistakes in a very difficult group, and that I have at least laid down the foundations for its proper study. With regard to Dr. Harvey's "types," the specimens belonged to me, and were described under my personal supervision, correction and direction, and Prof. Smith, in complimenting Dr. Harvey's accuracy, is unwittingly betrayed into complimenting me.

In conclusion I may make some remarks on species of mine "not placed" by Prof. Smith. I am surprised that *A. Fishii* Grt. is not placed, although in the list it is marked by a star. This is a very pretty and distinct Eastern species from the sharp contour of the wings and the peculiarities of the ornamentation of colour. *A. juncta* is a dark species, recalling in colour the commoner blackish-brown *Agrotids*, but with the stigmata fused, recalling the *Hollemanni* group. I do not doubt its validity, nor that of *nanalis*, the smallest form known to me and resembling *opaca* in appearance. *Mamestra insulsa* Walk. is, I say, on p. 43 of my essay, an *Agrotis*, evidently allied to *Repentis*. What does Prof. Smith mean by saying (p. 209): "Mr. Grote, whose reference of the species to *Agrotis* has been followed, gives no suggestion as to the species it most resembles or where its allies are to be found"? Again, Prof. Smith calls my *Herilis*, "herelis"; *badinodis*, "badinodes"; *insulsa*, "insula"; in all these cases I do not know why.

Finally, with regard to two species rejected from *Agrotis* by Prof. Smith, I would say that I could not determine the structure of the feet in the type of *niveivenosa* (coll. Hy. Edwards). In my New Check List I draw attention to its resemblance to *Cladocera*. I do not believe it is a *Hadena*, as Prof. Smith classes it. I can well believe that *Alaskæ* belongs to my genus *Agrotiphila*, which in my New Check List I place in the *Heliothini*. I am pleased that my recently expressed opinion that *A. hospitalis* Grt. is a valid species, distinct from *perconflua*, is confirmed by Prof. Smith.

On page 92 the author remarks: "Mr. Butler says *augur* is the type of *Graphiphora* Ochs., in which case the application of the name to the *Teniocampa* series by Mr. Grote would be unwarranted." I reply, that I have shown that the term *Graphiphora* is not originally Ochseneimer's but Hübner's, and that its true type is *Gothica*, Check List, 1876, p. 37. It is, therefore, strictly speaking, to be employed instead of *Teniocampa*. As to the affinities of *Agrotis* with *Teniocampa*

I have elsewhere explained myself. There are several other points in Prof. Smith's paper to which I could reply, or as to which I could express an adverse opinion, but I am so much gratified that a needed revision of the species of *Agrotis* has been accomplished, that my own justification or the vindication of my priority in particular instances, becomes a matter of little moment. Any errors it may contain will no doubt be rectified in the future, and in the meantime we have in it a valuable repository of our knowledge of the North American species of *Agrotis*.

ON THE POSITION OF LIMENITIS PROSERPINA, EDW.

BY W. H. EDWARDS, COALBURGH, WEST VA.

Mr. Scudder, in Butt. N. E., argues at length in favor of considering *Proserpina* as neither more or less than a hybrid between *L. Arthemis* and *L. Ursula* (called *Astyanax**). I differ from him, holding *Proserpina* to be a dimorphic form of *Arthemis*, just as *Papilio Glaucus* is a dimorphic form of *P. Turnus*.

**Astyanax* is one of the resurrected names which I, with many entomologists, hold to be objectionable and not to be adopted to the exclusion of names long in use and familiar, repeatedly treated of and figured in books. In the words of the late B. D. Walsh, one might as well "tell New Yorkers to call their city New Amsterdam, or the English to have their letters addressed to Londinium, because these were the original names." Fabricius, in 1775, named the species *Astyanax*. In 1793, he renamed it *Ursula*, for the following reason: it then stood in the genus *Papilio*, in which also stood another species by name of *Astyanax*. He therefore changed the first of these to *Ursula*, and by this name the species has been known to this day—almost 100 years. It is so figured by Abbott and Smith, 1797, and by Boisduval and Leconte, 1833. That Fabricius was right in changing the name to avoid a duplicate in the same genus is undoubted, and although the second *Astyanax* has since been found to be the female of something else, there is no reason for now disturbing *Ursula*. It was a common practice with the early naturalists, and especially with Linnaeus, to change a name given for another, and the change was accepted by their contemporaries. In some cases we can to-day see the reason; in others we cannot, but that there was a sufficient reason at the time is not to be questioned. There was no "priority rule" at that day. To deny that Linnaeus had the right to change one of his own names if he saw fit is a piece of impertinence. No rule of the kind spoken of was ever adopted till 1842, and that could properly have no retroactive effect. The resurrection of obsolete names has been the greatest possible nuisance during the last 20 years or since the publication of Kirby's Catalogue. Two years after the appearance of this Catalogue in 1872 1st July, as appears by the Trans. Ent. Soc., London, the following circular, addressed to entomologists, was laid before the Society, with signatures of most of the leading British entomologists appended:—"ENTOMOLOGICAL NOMENCLATURE.—The undersigned considering the confusion with which entomological nomenclature is threatened (and from which it is already to no small extent suffering) by the reinstatement of forgotten names to supersede

Now what are the known facts about *Proserpina*?

1. The species *Arthemis*, black, with a broad common band of white across the disks, occupies the whole northern part of the continent, from ocean to ocean, and from the Arctic Circle to northern Massachusetts and westward to Wisconsin.

2. Along the southern border of the range of *Arthemis*, in certain localities only, there flies, and constantly associates with it, a small black form agreeing exactly with it in size and in outline of wings. This form may either be without a white stripe across the disks (*vide* Butt. N. A., 2, pl. 36, fig. 5), or it may present such a stripe corresponding in position

those in universal employment, urge upon entomologists the desirability of ignoring the names so brought forward until such time as the method of dealing with them shall be settled by common agreement.

"(Signed)

H. W. Bates.
Alfred R. Wallace.
Wm. C. Hewitson.
Francis P. Pascoe.
T. Vernon Wollaston.
John A. Power.
Samuel Stevens.
Edward Sheppard.
Ferdinand Grut.
J. W. Dunning.
Frederic Moore.

W. Arnold Lewis.
Frederick Bond.
J. Jenner Weir.
E. Shepherd.
Edw. W. Janson.
Edw. Newman.
E. T. Higgins.
B. F. Logan.
J. Greene.
Thos. H. Briggs.
W. C. Boyd.

Howard Vaughan."

And following this: "Professor Westwood stated that . . . he considered a law similar to that which limits adverse claims to real property in this country to a period of twenty years, might with equal advantage be applied in zoology."

Now, since 1872, there has been no "common agreement" by entomologists as "to the method of dealing" with these "forgotten names," and the question stands just where it stood then. Mr. Scudder, apparently, in order to get some show of authority for resurrecting dead names, has followed, he says, "the rules laid down by the American Ornithologists Union"! (What have entomologists to do with the rules of American Ornithologists?) And so he displaces a large proportion of the recognized names in American lepidopterology for dead and forgotten, and what is worse, often wholly unauthenticated ones. Thus we get *Danaus Plexippus* for *D. Archippus* (in his earlier writings he called it *D. Eriippus*), *Limenitis Archippus* for *L. Disippus*, *Papilio Polyxenes* for *P. Asterias*, *Neonympha Eurydice* for *N. Canthus* (absolutely without any right whatever), *N. Phocion* for *N. Areolatus*, *N. Cornelius* for *N. Gemma* (both these unauthenticated), etc., etc., without end. One of the strangest changes of all is that of *Papilio Turnus* into *P. Glaucus*. *Turnus* has been described 119 years, and during the entire period has been known by that name alone. *Glaucus* was described 126 years ago from one sex only. It is not a species at all, it is the black dimorphic female of *Turnus*, and it has no corresponding male. It is scarcely twenty years since this fact was made known. As a dimorphic form it needs a distinguishing name. It is the practice to give such forms names. Mr. Scudder now calls the entire species *Glaucus*, but to get a name for the black female he calls it *Glaucus-Glaucus*! and there is no *Turnus* any more. Is not that a precious device! I advise every lepidopterist to ignore such changes, one and all, and to adhere to the accustomed names, nearly every one of which has a full century of undisputed title.

to the outer edge of the white band of *Arthemis* (as in Butt. N. A., 1, pl. 41, figs. 1, 2). It is rarely or never solid white, of clear colour, as in *Arthemis*, but is slight and often nebulous.

3. South of the territory occupied by *Arthemis* is the black species, *Ursula*, flying to the Gulf of Mexico and at the southwest, in Arizona at least. Over a considerable belt, say perhaps of fifty to one hundred miles width, along the southern range of *Arthemis* and northern range of *Ursula*, many examples have been taken which are undisputed *Ursula*, but have more or less distinct traces of a white stripe similar to that seen in *Proserpina* (Butt. N. A., I., pl. 41, figs. 3, 41, for such an example of *Ursula*), though never so heavy as in the most strongly marked examples of *Proserpina*. South of this belt, so far as I am aware, such striped examples have not been taken. *Ursula* without modification or variation occupies many degrees of latitude, but in the southwest comes to be considerably changed and is lost in its variety *Arizonensis*.

4. I myself obtained eggs from a female *Proserpina* at Stony Clove, in the town of Hunter, in the Catskills, elevation 2,000 feet, and from these eggs raised four pupæ from which came three *Arthemis* and one *Proserpina* (this last is figured in Vol. II. before cited), so establishing the dimorphism. The relationship of the two forms had been suspected but never proved. Mr. Mead relates, CAN. ENT. VII., 162, that he obtained about 500 eggs from fifteen females *Arthemis*, and 31 eggs from a single female *Proserpina* at same time, showing the black female to be as fertile as the pied one.

5. I am thoroughly familiar with this part of the Catskills—in fact was born and bred in the town of Hunter—and for many years collected butterflies there, and I can say positively that I have never seen an example of *Ursula* there. It does not fly at all in that elevated district. On reaching the Valley of the Hudson, ten miles west from Stony Clove, *Ursula* begins to appear. Nowhere is the surface in Hunter at less than 1,700 feet, and all the highest peaks of the range are within the town limits. Between the Clove and the river valley are Round Top, High Peak, etc., and the lowest ground is the summit of the Kaaterskill Clove, elevation nearly 3,000 feet.

6. In preparing the text for *L. Arthemis* for Butt. N. A., I made careful enquiries about *Proserpina* all along the line from Maine to Wisconsin, and published the information gained. This form was rare in Maine, not common in south New Hampshire, unknown in Vermont, as also

in the Adirondacks of New York; common in middle Michigan, and in certain localities in Wisconsin. Had not been seen at Toronto, Canada, but occasionally was noticed at Hamilton. That is, along a line of 1,000 to 1,500 miles on the southern border of the range of *Arthemis*, and the northern border of the range of *Ursula*, at a few spots only had *Proserpina* been observed east of Michigan (to the west there is no definite information). The only region where *Proserpina* was known to be abundant is in the town of Hunter above spoken of. All this appeared from the evidence spread out in the Butt. N. E.; and Mr. Scudder has been able to add nothing to it but this, that in "the Graylock Hopper" (an elevated valley in the mountains) at Williamstown, Mass., *Proserpina* was "tolerably common." As to its abundance at Stony Clove we have the direct testimony of Mr. Mead, who also collected there year after year. Speaking of one year he says:—"When I collected every *Proserpina* I could find I took 110, of *Arthemis* I actually did take about 200 and could have taken 1,000 without any difficulty.

7. In all the preparatory stages *Proserpina* and *Arthemis* are precisely alike, and both are specifically removed from *Ursula*. Witness the figures of the eggs, *Arthemis*, Butt. N. E., pl. 64, fig. 15; *Ursula*, fig. 12. I have Mrs. Peart's drawings of the eggs of both *Proserpina* and *Arthemis*, and they are indistinguishable. In the first two larval stages all this group are alike, but at second moult each species takes on characters of its own. Fig. 26, pl. 74, given by Mr. Scudder as *Arthemis* mature larva is copied from Trouvelot's drawing of *Proserpina* (made for me and loaned for use in the Butt. N. E.). This drawing is named on its card *Proserpina*, and of course, in giving it on his plate as *Arthemis*, Mr. Scudder was satisfied that it answered equally well for either form. I have another drawing of *Arthemis* at the same stage, made by Mrs. Peart, and all its peculiarities are shared by *Proserpina*. These are widely different from the mature stage of *Ursula*, as is plain from Mr. Scudder's figures of the latter, pl. 17, figs. 17, 21. Just so, the pupæ of *Arthemis* and *Proserpina* are alike (I have drawings of both), and differ specifically in form and colour from the pupa of *Ursula*, Butt. N. E., pl. 83, fig. 12, for *Ursula*; fig. 14 for *Arthemis*, copied from Mrs. Peart's drawing of *Proserpina*. So we have, on the one hand, the two co-forms, alike in each and all of the three earlier stages, and alike in size and shape of wings in the imago, (and Mr. Scudder allows this to be the fact, by using the drawings of larva and pupa of the co-forms interchangeably); on the other, *Ursula*, differing distinctly in the three stages,

and nearly always much larger in the imago, with differences in the shape of each wing. (As is well shown in Butt. N. E., pl. 2, *Arthemis* fig. 5, *Ursula* fig. 8.)

8. All the species of *Limenitis*, at the east, have one style of flight, and it is that which Mr. Scudder attributes particularly to *Disippus* (his *Archippus*): p. 277, "the flight is rather leisurely and sailing; it moves irregularly from place to place." Of *Arthemis*, he says, p. 300, it has "a rather short and rapid flight." Perhaps it has sometimes, but usually it has the same leisurely flight as *Disippus*. Of *Ursula*, p. 287: "Its flight is similar to that of *Disippus*, but still more *lofty and grand*, more leisurely and sweeping." *Ursula* is a very common species here at Coalburgh, and I can bear witness that there is nothing lofty or grand about its mode of flight. It darts about from place to place, from the ground to a leaf on tree, from tree to ground, haunts one locality, and once seen may be seen there regularly for days; feeds on excrement on the ground, and lingers about the spots where that is to be found. A sustained flight would be contrary to its observed habits. I should as soon expect an *Apatura* butterfly to fly long distances as a *Limenitis*. The habits of the two are very much alike.

In the argument to prove *Proserpina* to be a hybrid between *Ursula* and *Arthemis*, instead of a dimorphic form only of *Arthemis*, Mr. Scudder says:—" *Proserpina* occurs only in a very narrow belt across the eastern third of the continent, a belt which forms the southern boundary of the range of *Arthemis* and the northern of *Ursula*. It is known at so many points in this belt, *that it presumably occurs wherever Arthemis and Ursula are brought into contact.*" That this is an unwarrantable assumption follows from what I have before stated. "There are but two arguments used to prove the improbability of such a relationship as is here urged: 1. To assert that *Proserpina* has been found where it is probable that *Ursula* does not occur within at least an easy day's flight; a distance of a few miles is of no account whatever." Is it not? Are we to suppose that *Ursula*, male, of the Hudson River Valley, is so seized with a longing for *Arthemis* female, of Stony Clove, as to transform him from a short and leisurely flyer into one "lofty and grand," to whom "the distance of a few miles is of no account whatever," and cause him to desert his own females and scale mountain ranges for other females whom he has never seen nor heard of, and of whom there cannot be a hereditary reminiscence? Or do the *Arthemis* females attract the

males *Ursula* by an emanation after the fashion of the Bombycid females, perceivable ten miles away at the very least? There ought, on any theory of attraction, to be a steady flight of *Ursula* males across the peaks, and once arrived at Stony Clove they should take up their abode there, and be seen in company with these so ardently sought females. But they are not there—never in a single instance have been seen there; and to attribute to them such powers of flight is contrary to what Mr. Scudder is fond of calling the “stupid fact.”

On the other hand, the *Proserpina* males and females live with the *Arthemis*, mate in both sexes with the two sexes of *Arthemis*, and the eggs of one form hatch as readily as do those of the other. The black males mate with black females, and pied males with pied females. Black on both sides will account for the black progeny considered by Mr. Scudder as so close to *Ursula*; and the other mixtures will account for every phase of colour or marking exhibited. Mr. Scudder proceeds: “Several instances of undoubted hybridism are known in the genus.” On which I remark that distinct species of other genera are also known to copulate, and it is not uncommon of *Colias*. And there are instances of species of unrelated genera, even sub-families, copulating. The late W. S. Foster, in 1889, on one of the peaks in Colorado, captured a male *Melitæa Palla* in copulation with a female *Chrysophanus Snow* and they only separated in the cyanide bottle. I have the two mounted by Mr. Foster on one pin, with his label stating the facts attached. Also he notified me of the capture at the time it was made. Mr. Bruce has twice taken pairs of *Lycæna* of which the sexes belonged to different sub-groups in copulation. Such instances go to show that a male, not finding its own female, may seize another, even one wholly unrelated. What fierce passion possesses the males of butterflies may be seen by referring to the history of *Heliconia Charitonia*, Butt. N. A., Vol. II. But when females of a species are abundant, it does not seem very probable that a male will seek the female of another species, much less scale the Catskills to find her!

“*Proserpina* partakes of the characters of the two species mentioned . . . ; it possesses, in fact, just the characters we should expect of a hybrid between these two species. It varies most towards *Ursula* where this prevails, and most towards *Arthemis* where that prevails.” I have answered this in the preceding paragraph. No *Ursula* need to be called in for the solving of this puzzle.

"A careful comparison of a considerable series shows that there is no difference whatever in the genital armour of *Proserpina* and *Ursula*." We should like to have heard whether there is any difference between the armour of *Arthemis* and *Ursula*. The form *Proserpina* is undeniably related to *Arthemis*, only supposably to *Ursula*. If the genitalia, as evidence of specific value, are worth anything, then there should be no differences whatever between *Arthemis* and *Proserpina*. Therefore, if these organs in *Proserpina* are like *Ursula*, as Mr. Scudder tells us, in *Arthemis* they must also be like *Ursula*. But it is implied in the foregoing statement that this is not the case, but that *Arthemis* is unlike both *Proserpina* and *Ursula*. The preparatory stages tell a very different story, and I prefer to believe their testimony rather than that of the other.*

Why any where *Arthemis* has a co-form, or how such form has come to be, is not explainable, any more than why *Papilio Turnus* has a black female as well as a yellow one. The fact is all we know. From the Northern States to the Arctic Circle, in just the territory occupied by

*Are the genitalia valuable in determining species? I doubt it much. We do not need to examine them to prove that two species plainly distinct in the imago are really so as *Papilio Turnus* and *Philenor*. It is when the imagos are puzzling that help from any quarter would be welcomed; as in case of the *Grapta C album*, *Comma*, *Satyrus* and *Faunus*. Will they help us here? Looking at Mr. Scudder's plates, I see that what I consider natural genera, as *Colias*, *Argynnis*, *Limenitis*, etc., have each their own type of these organs. It is not to be supposed that they are cast in moulds like so many iron pots and knowing that every other organ varies, we have the right to believe that the genitalia vary also. How much is the question. In the plates the figures are not drawn to an uniform scale, and the organs are differently exposed, probably drawn as they had dried. Some seem to have shrunk in the drying, others perhaps are done from green subjects, and are full and plump. But taking them as they stand: on pl. 33 all these species of *Limenitis* seem to be essentially alike, and I apprehend that the variation between them is no greater than would be found between individuals of each. So the three *Argynnis*, *Atlantis*, *Cybele* and *Aphrodite* are essentially alike. *Grapta Progne* cannot be distinguished from *G. Comma*, though they belong to different sub-groups, while *G. Faunus* differs conspicuously from *Comma*, though these two belong to the same sub-group, and can be but one remove from a common ancestor. On pl. 34 *Phyciodes Tharos* and *Batesii* are alike; and quite a lot of *Theclas*, together with *Incisalis Nippon* and *Irus*, seem all alike and nowhere specifically different. On pl. 35, the three *Colias*, *Interior*, *Philodice* and *Eurytheme*, are as like as three marrowfats. My friends why are things thus?

If the test is not infallible it is not to be trusted. If it fails anywhere it may fail often. Now, on page 329, under the head of *Grapta Interrogationis*, we read these words: "The two forms (of this species, to wit, *Fabricii* and *Umbrosa*) differ so greatly and so constantly from each other, not only in the colouring but in the form of the wings, and even in the abdominal appendages (the genitalia), that they have been considered distinct species"! That is, if they had not, by breeding from the egg, been proved to be one species by the evidence of the genitalia they would be considered as two! It seems to me this settles at once and for all the value of these organs as tests of species. The study of them may amuse an idle hour, the drawings of them are very pretty, but that they are of any value so far as concerns closely related species does not appear.

Arthemis, the yellow female *Turnus* alone is found. Along the southern boundary the black one appears; here and there a single individual, and having once got a foothold the black form gradually gains the mastery, and in the south alone rules. There are no yellow females of *Turnus* there.

It seems to me not improbable that *Arthemis*, of all its group, is nearest the parent species. Every character, from egg to imago, shows that all these species are very closely related, and apparently not more than one remove from a common form. *Arthemis* being so dominant, occupying the north, whence most species are supposed to have come, it may even be identical with that form. Having once given rise to a black co-form, this last has gone southward and become modified in shape of imago and color, and in the southwest is itself replaced by its own variety *Arizonensis*.

That two distinct species wherever they come in contact can cross freely, and originate a permanent, intermediate and hybrid race, I do not believe. And, in the present case, the so-called hybrid race is not intermediate, but entirely on the side of one of the supposed parents, to wit, *Arthemis*, and a long way from the other, to wit, *Ursula*. Analogy shows us that it is a case of dimorphism, not hybridism.

TEN NEW SPECIES OF ORTHOPTERA FROM NEBRASKA— NOTES ON HABITS, WING VARIATION, ETC.

BY LAWRENCE BRUNER, LINCOLN, NEBRASKA.

(Continued from page 40.)

Xiphidium modestum, n. sp.—Related to *X. saltans* Scudd. and *X. strictum* Scudd., from both of which species it differs in its smaller size, slenderer form and in colour.

Vertex or cone of the head not quite so broad and shorter than in *saltans*, its closest ally; pronotum with the sides less bulging, and not reaching as low as in that species. Tegmina very short, only about one-third as long as the abdomen, with the shrilling organ of the male narrower and a little further removed from the base of the wing than in its allies. Posterior femora quite slender, of moderate length. Tip of male abdomen but slightly enlarged, the cerci elongate, tapering, a little curved outward and furnished with a rather long sub basal tooth. Ovi-

positor about as long as the body, quite slender and tapering, with a gentle upward curve.

Dull testaceous, sometimes with a very faint greenish tinge, the usual markings of the genus deep chocolate-brown and well defined.

Length of body, ♂, 10.5 mm., ♀, 11 mm.; of antennæ, ♂, 30 mm., ♀, 40 mm.; of tegmina, ♂, 3.25 mm., ♀, 2.75 mm.; of hind femora, ♂, 9 mm., ♀, 10 mm.; of ovipositor, 11.75 mm.

This modestly coloured little grasshopper is very plentiful upon uplands throughout eastern and middle Nebraska, where it is to be met with among the short grasses in company with *saltans* and *strictum*. While long-winged forms of both of its near allies are quite common, no specimen of *modestum* has been taken to my knowledge, save of the typical form. This insect also occurs in middle Kansas, Western Iowa and South Dakota.

Xiphidium attenuatum Scudd.—Generally dull testaceous with the usual brown markings of the genus, in some specimens tinged with greenish. Tegmina and wings either abbreviated or fully developed—when the former, about reaching, and when the latter, considerably surpassing the tip of the abdomen in both sexes. Antennæ very long and slender. Ovipositor long, slender, straight or but very gently curved, the apex very acuminate.

Apex between the eyes rather narrow, with the sides abrupt and sharp, the cone but little rounded, not expanding, obliquely docked. Face nearly straight, oblique as in *X. strictum* to which it bears the closest general resemblance. Head and pronotum a little shorter than in that species. Abdomen tapering but slightly posteriorly, with the base of the ovipositor only a trifle enlarged. Posterior femora heavy on their basal two-fifths, slender beyond; the tibiæ also quite slender. Tip of male abdomen a little enlarged, the cerci long, broad and but gently tapering apically, the basal tooth minute, slender.

Length of body, ♂, 12 mm., ♀, 15 mm.; of antennæ, ♂, 55 mm., ♀, 60 mm.; of pronotum, ♂, 2.60 mm., ♀, 3.3 mm.; of tegmina, short form, ♂, 8.5 mm., ♀, 9 mm.; of long form, ♂ and ♀, 19 mm.; of hind femora, ♂, 12 mm., ♀, 14 mm.; of ovipositor, 22–29 mm.

This beautiful species is quite common at West Point, Nebraska, along the lakes and old river beds of the Elkhorn river, where it is found among

a rank grass growing near the water's edge and on very damp meadows. The females insert their slender ovipositors and lay their eggs between the blades and stem. It is very active in its movements, and when disturbed easily eludes pursuit by creeping down among the dense mass of grass.

Xiphidium nigropleurum, n. sp.—In its general structure very similar to the preceding, but with a much shorter ovipositor. Bright transparent green, with eyes, stripe on the occiput and the sides of the abdomen shining black.

This meadow grasshopper is a moderately robust species, with narrow vertex, short occiput, large globular eyes, broad pronotum and strongly veined tegmina which in the male are furnished with a large shrilling organ. The tegmina are usually abbreviated, reaching only four-fifths the length of the abdomen; but an occasional specimen is to be found in which the wings are fully developed and then reach to the extremity of the ovipositor in the females. Ovipositor straight, quite broad and heavy, about as long as the body. Male cerci of medium length, rather stout, tapering gently towards the apex, and with a strong sub-basal tooth. Antennæ long and slender.

General colour bright transparent-green, with the markings on the occiput, pronotum and abdomen bordered with yellowish-white which contrasts strongly with the other colours, which character taken together with the vitreous or glassy appearance of the entire surface, render this insect quite conspicuous among the members of the genus.

Length of body, ♂, 13.5 mm., ♀, 15 mm.; of antennæ about, ♂, 43 mm., ♀, 50 mm.; of pronotum ♂, 3 mm., ♀, 3.6 mm.; of tegmina ♂, 9 mm., ♀, 8 mm., short, 19 mm., long; of hind femora, ♂, 13 mm., ♀, 15 mm.

This beautiful insect, which is our most active species of the genus, is quite plentiful among the rank vegetation on low, moist grounds, and is especially common in wet places where the "cut grass" (*Leesia oryzoides*) grows. The supposition is that this grass offers a better place than usual for the deposition of its eggs which, like those of the "lance-tailed" meadow hopper, are deposited between the leaves and stems of grasses. Grape vines and other creeping plants which form matted clusters that afford shelter from the noonday sun and the bright light of day are

favorite haunts for this and other species of our nocturnal grasshoppers and a few of the arboreal crickets.

The "black-sided grasshopper" is found throughout the eastern half of the State along all of the streams, the banks of which are lined with shrubs and trees. Whether or not it is to be found beyond the region of "forests," I am not prepared to say at present. In a collecting trip taken during the summer and fall of 1888, for the purpose of ascertaining the approximate range of various species of our Nebraska orthoptera, this species was not seen west of Antelope County, on the upper Elkhorn river.

While speaking of the members of the genera *Xiphidium* and *Orchelimum* it might be well to record a few notes relative to their variation in wing-length and habits. Undoubtedly everyone who has had occasion to examine any of our common species of these grasshoppers, has noticed that wing-length was a character not to be relied upon as specific or even varietal difference. A very little examination will at once suffice to show this. So far I have long and short winged specimens of the following species in my collection:—*Xiphidium brevipenne*, *ensiferum*, *saltans*, *strictum*, *lanceolatum* and *nigropleurum*. Of *X fasciatum* I have only long-winged, and of *nemorale* and *ictum* I have only those with short wings. *X. gossypii* is not definitely known to me, and therefore it is not possible for me to venture any remarks upon its wing characters. Many of these insects are quite active fliers and are often attracted after night to bright lights. All of the long-winged forms mentioned above have been taken by me in such locations. That they often fly to great distances is evident, from the fact that both the *lanceolatum* and *nigropleurum*, described in this paper, have been captured at the electric lights in cities at points upwards of a mile from their natural haunts.

The various species of *Orchelimum* also vary somewhat in wing-length; but in no case, so far as I am aware, is the variation so great as in the insects alluded to above. These too are attracted by lights; and it is often the case that the best things are captured here.

Among our grasshoppers of the genus *Orchelimum* I find several forms that do not appear to have been characterized. Of these two of the most interesting will be described.

(To be continued.)

NOTES ON COLEOPTERA—NO. 7.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

Philonthus quediinus Horn. A male specimen of this fine species was taken here. As the anterior marginal puncture of the thorax is placed so unusually far behind the margin, and on a line with the three discal ones, the discal punctures are apparently four. In this specimen the singular bunch of bristles on the penultimate ventral segment consists of about six, all differing in length, and rising from a small median pit resembling somewhat that seen in the male of some species of *Dermestes*. The female was not found, and to distinguish it from those of *palliatius*, var. *rufulus* Fauv., *fusiformis*, *fulvipes* or *occidentalis*, the number of the thoracic punctures, very sparsely and finely punctured elytra, and quediinus like aspect, would chiefly have to be depended on. Previous recorded occurrence: Detroit, Mich.; Kansas.

Xantholinus sanguinipennis Lec. This species is very common and abundant on Brigantine Beach and at Atlantic City under trash from the Bay. It is very easily confused with *X. cephalus*, which occurs with it more sparingly and is similarly coloured; the elytra are however of a clearer red without any tendency to become infusate as in the latter; the dorsal and lateral series of punctures of the thorax are more numerous, coarser and constant, being exceedingly fine and some of them often obsolete in the latter. The separation of the upper and lower marginal lines of the thorax in the former species and their union anteriorly in the latter is not a character of easy observation in the hurry of collecting. *Sanguinipennis* will probably be found to be a littoral species. *Cephalus* occurs here, but always under bark, and I can see no difference between these examples and such as are taken under rubbish on the coast.

Canthon laevis Drury. Since Mr. Blanchard's very clear statement of the differences between this and *chalcites* Hald. (Tr. Am. Ent. Soc., XII, 164), it might be supposed these species would seldom be confused; the case is, however, different, probably owing to this exposition not being generally in the hands of collectors, and the great similarity of the more abundant colour forms of both species which renders tradition useless. In northern collections *laevis* is always correctly named. It is distributed from Maine to Mexico and California; in Canada, the New England and Middle States its usual colour is coppery black or brown, but south and west it varies from this to black, blue and green through all shades.

Chalcites seems to be much less common and abundant, being found in the Southern States north to Virginia, and westward to Texas, Missouri, Illinois, Nebraska and Kansas. Its colour is usually coppery, like the bronze form of *lævis*, which seems to be confounded with it by some of the western collectors, and sent as that species to their correspondents, while the name *lævis* is applied to all individuals otherwise coloured. This at least is my experience. However close the species may approach in colour and sculpture they may be infallibly separated by the smooth or granulated pygidium; that of *lævis* being always more or less granulated, and that of *chalcites* entirely smooth and without polish.

Aphodius explanatus Lec. The species was described by Dr. Leconte from a female unique taken in Colorado, which was redescribed by Dr. Horn in his monograph of the family. I am indebted to Mr. T. D. A. Cockerell for a male example taken by him in Custer Co., Colo., and note the following differences. The head is trituberculate with small but well developed tubercles, and with the side margins indistinctly rufous; the thorax has the side margins rufous till near base, which is not rufous, with the medial impressed line exceedingly fine and nearly reaching the apex; the first joint of the hind tarsus is equal to the two succeeding: the club of the antennæ is not darker than the stem, otherwise the descriptions of the female apply. The mesosternal carina is quite fine, and can be best seen when viewed transversely just in front of the coxæ.

Aphodius leopardus Horn. This species is taken at Sudbury, Ontario, by Mr. John D. Evans. Heretofore recorded as occurring in eastern Canada, Maine and New Hampshire. *Pompophæa Sayi* Lec. was likewise taken at Sudbury.

Microclytus gazellula Hald., *Clytus gazellula* Hald., Trans. Am. Phil. Soc., X., 1847, p. 42; changed by Haldeman to *C. gazellula*, Proc. Am. Phil. Soc., IV., 372 (not P. Acad. Phil.); *Clytus gibbulus* Lec. Agassiz, Lake Superior, 1850, 234; *Cyrtophorus niger* Lec. Jour. Acad. Nat. Sci., Series 2, II., 29, March, 1850; *Microclytus* (genus created by Dr. Leconte), Smith, Misc. Collec., 1873, XI., 320; *Cyrtophorus gibbulus* Lec. († *niger* Lec.) = *microclytus gazellula* Hald. CANAD. ENT., XVI., 1884, p. 148 (Leconte and Horn).

Though not intended so by the describers, these names may be regarded as representing the colour variations that occur in this species: *gazellula*, pale-brown individuals; *gibbulus*, such as have the anterior half of the elytra ferruginous—the posterior piceous; and *niger*, such as

are entirely or nearly piceous, except the legs and antennæ. Haldeman's description is so bad that it took Drs. Leconte and Horn more than thirty years to find out that *gibbulus* was synonymous. *Gibbulus* is fairly described; *niger* could not well be known had not the describer himself made the synonymy. It would appear from the Jour. Acad., l. c., that he intended to cite *gibbulus* from Agassiz, Lake Sup., but by a slip of the memory wrote *niger*, hence the (\S *niger*) cited above which seems a rather doubtful use of the error mark. But in writing the description he evidently had a different coloured example before him than that from which he described *gibbulus*. This species, though distributed from the Lake Superior Region and Canada southward to Virginia is not commonly taken, though it might be were its habits more generally known. Its biological record, so far as I know, is as follows: Mr. Blanchard dug a specimen from the bark of a living white oak quite late in October, CAN. ENT., VII., 97. Messrs. Reinecke and Zesch dug four specimens from bark on oak trees, May 6th, 1883, Bul. Brook. Ent. Soc., VI., 36, and remark their longevity. Mr. Harrington took at Ottawa, Canada, three examples on hickory and on sumac flowers in July, CAN. ENT., XVI., 73.

To this record I may add that I took here a male on plum blossoms about the first of April.

Prof. Jerome Schmitt, of St. Vincent College, Westmoreland Co., Pa., took six females early in the season (a set of which, through his kindness, now grace my collection), a history of which I am permitted to publish, which I think best to do in his own words: "They were crawling when observed on a smooth place on a living oak, elsewhere covered with rough, thick bark. Unlike most Cerambycids it is very slow and staid in its movements, and difficult to see because of its resembling the bark very much by its colours and its persistent hiding in the galleries of the bark made by some larvæ, or abandoned by a small myrmecid—*Leptothorax longispinosus*." Prof. Schmitt also writes of having seen this species several years previously on a green oak trunk under similar circumstances, and thinks it very probably breeds in the rough bark. These examples and that taken by myself were of the *niger* colour. Mr. Reinecke has sent me a female and male *gibbulus* which so resembles the common form of *Cyrtophorus verrucosus* as to require a close look to distinguish.

The above records appear to warrant these deductions:—

1st. The species breeds in the rough bark of oak.

2nd. Some individuals develop before winter, hibernating as beetles without leaving the bark, coming forth in early spring; others hibernate as pupæ or larvæ, changing to beetles later in the season.

3rd. That the beetles may be obtained from October to June by judiciously chopping the bark.

The characters separating *Cyrtophorus* and *Microclytus* were originally feeble, and have recently become more so by some one (the record has escaped me) discovering that the relative length of the antennal joints in the male of the latter are the same as in the former, thus leaving in the males only the presence or absence of a small spine at the end of the third joint of the antennæ as diagnostic. This discovery was made subsequent to Mr. Leng's synopsis of this genus in *Entomol. Americana*, III., 23.

Anthophilax malachiticus Hald. This species occurs here rarely, and my specimens, male and female, I owe to the kindness of Professor Schmitt, of St Vincent, who takes it on chestnut blossoms. The male and female differ in form and perhaps in colour, though the scarcity of examples renders this uncertain. The male is the more elongate, with elytra suddenly narrowed behind the prominent humeri, then scarcely perceptibly so to near tip, which is rounded. In the example before me the head and thorax are bright coppery bronze, the elytra lustrous dark greenish, the underside greenish and bluish black, the legs are rufous with the knees, tibiæ and tarsi more or less infusate. The female is broader, the elytra not so much narrowed behind the humeri and nearly parallel behind the constriction; the head, thorax and elytra are "splendent green"; the underside is darker and obscured by the vestiture, the legs are coloured as in the male; both sexes have the last ventral segment broadly rounded, and the head, thorax and underside clothed with fine, soft, whitish hairs, longer and sparser on the thorax. The male belonging to *malachiticus* has not, so far as I know, been described, and the above from only the single individual before me is not likely to apply to all others. A series from different parts of the country, from what occurs in other similarly coloured species, may be expected to yield specimens in both sexes varying from coppery bronze to green, blue or violet, and with legs from black to rufous. *Stenura cyanea* Hald. from Lake Superior seems to be only a greenish blue example, and *A. viridis* Lec. from the same region with the legs black, though the base of the tibiæ is rufous, merely a colour variation. These

forms are likely to be eventually united. Prof. Schmitt has likewise examples of *A. viridis* and of *A. attenuatus* Hald. taken in Elk Co., Pa. *A. malachiticus* is reported to be taken in this vicinity by an amateur, who keeps the locality secret, but I have seen none of his insects.

O. Psenocerus (Clytus) Supernotatus Say, Lec. Ed. II., 200; *pini* ‡ Lec., Jour. Acad. Nat. Sci. Phil., Ser. 2, II., 158. On a former occasion (CAN. ENT. XVI., 36) mention was made of having taken three examples of this species hibernating in the folds of a *Cecropia* cocoon. December 9th I found a good sized nest of a yellowish paper wasp in a clump of briar bushes, from which I took five of these beetles while examining its structure; they were stowed away quite snugly between the overlapping layers of paper and doubtlessly would have passed the winter in comparative comfort. Hibernation, while perhaps an exceptional habit of this species, would seem to be of not infrequent occurrence. The beetle is found on currant, gooseberry, wild and cultivated; wild grape, Virginia creeper, etc., abundantly from June onward; the larvæ live in the diseased or dead limbs of these and hibernate in various stages of their growth, developing during the summer. Mr. A. Fitch named it the "currant borer" and gave a detailed account of it in Rep. III., 98-105, but I have observed no mention of it recently by economic entomologists.

Chromatia (Cistela) Amara Say. This species was described by Mr. Say from specimens taken west of the Mississippi, and appears to be rare. An insect assigned to this name, occurs sparingly along the western slope of the Alleghanies from Virginia to New York and Canada, though it is scarcely recognizable by Say's description, which must have been made from very differently coloured specimens with the head and palpi, the elytra and feet, black—the rest sanguineous. The eastern examples have the head piceous black with the clypeus and mouth parts rufous, except the last joint of maxillary palpus, black; thorax and all the under side rufous; elytra brownish or piceous black, with the suture and first interval, epipleura, margin and external interval, rufous. As stated by Say, the striæ are closely, minutely punctured and the intervals finely transversely rugose.

This species I have through the kindness of Prof. Schmitt, who takes many good things at St. Vincent, rarely occurring here, though distant less than 40 miles. He allows me to say that he took in July large numbers of *Pltomophagus parasitus* from an ant's nest he was investigating, and in which at the depth of two and a-half feet he found a chipmunk's

nest under a root stored with grain and swarming with a small beetle like *Typhæa fumata*, but which on examination proves to be a species of *Cryptophagus*, probably undescribed. To his industry in this direction is due the honor of the discovery of a strange blind *Pselaphide* beetle living with ants (*Amphyocone pallipes*), recently described by Dr. E. Brendel under the name *Amphyoconica*, and for which he has created the genus *Anops*, Bull. Lab. Nat. Hist. St. Univers., Iowa II., 80.

Micracis suturalis and *aculeata* Lec. These species were bred together from hickory limbs deadened two years—the latter in great abundance, the former sparingly. I was unable to ascertain whether the larvæ live under the bark in the sap wood, or bore more deeply from the first. I could discover no galleries other than of *Chramesus icoriae*. The beetles came forth from the middle of May till the first of July. The species resemble each other greatly, and while extremes may be readily separated by the difference in the striation of the elytra and pubescence, yet individuals meet closely and are liable to be confounded. In general, *Suturalis* is the more slender and elongated, has the elytra smoother, less deeply striate and the pubescence more visible towards the apex,—sometimes wanting, sometimes extending forward nearly as in *aculeata* in which the hairs are claviform. They are about the same lengths, .10 inch, though the latter being thicker appears the shorter. In both the basal joint of the antennæ is flattened, triangular, and in the male the anterior margin and apex have a dense fringe of very long, pale yellowish hair of peculiar structure. Each hair seems to have a central rachis from which springs rows of long spiculæ which project forward, each of which in turn becomes the rachis of smaller spiculæ. These hairs when viewed under the low powers of a microscope are beautiful objects, appearing as if composed of glass; each basal joint has from 25 to 40 as near as can be counted. When at rest the edge of the joint bearing them projects in front giving the insect a formidable appearance. Were *aculeata* with these strange appendages and clavate bristles magnified to the size of an ox, it would be difficult to delineate an animal of more ferocious aspect. Inhabiting, as they seem to do, the smaller limbs of dead trees, in an economic sense they can scarcely be classed as injurious.

The observed records of distribution are few, owing most probably not to a scarcity of the insects, so much, as to their being neglected by collectors, like many of the other species of *Scolytidæ*.

Suturalis is recorded from Illinois (boring in xanthoxylon twigs), Michigan, Kansas, Louisiana. *Aculeata*, from Virginia, Buffalo, N.Y.

NOTES.

CANADIAN RHYNCHOPHORA.

In reference to Mr. Harrington's remarks on *Rhynchites bicolor*, I may say that it has been taken at Hamilton regularly for quite a number of years, never very plentiful but not considered rare. I always obtained my specimens when beating second growth oak and hickory. There are wild rose bushes in that locality, but I do not remember ever beating a rose bush; if I had known enough I might have found it more abundantly. Of *Attelabus rhois* I took two specimens once in the neighborhood of Hamilton; but on a visit to Brant, between the 13th and 30th of July, 1883, I took it in quantities. There was a neglected field of about five acres, overgrown with hazel, alongside of a bit of woods, and there at that time was to be seen in surprising profusion a great variety of choice Chrysomelidæ and weevils. I had got my previous specimens named by Mr. Reineke, of Buffalo, who gave me the impression that it was rare and valuable for exchange, so I took a lot with the result that even now there are about three dozen of them yet in reserve. J. ALSTON MOFFAT.

APHIDIVOROUS HABITS OF FENISECA TARQUINIUS (FABR.) GROTE.

The observation of Mr. Th. Pergande in the fall of 1885, as recorded by Prof. C. V. Riley in Am. Nat., June, 1886, p. 557, is the earliest published account of a carnivorous habit in a butterfly larva, that of *Feniseca Tarquinius* (Fabr.) Grote.

Some observations made by me a number of years earlier on this insect may yet be of interest, as I distinctly saw these larvæ eating the plant lice upon alder in the autumn of 1869, and bred the butterfly the succeeding May, and was thus the first to discover the apidivorous habit in a butterfly caterpillar. A number of the larvæ were concealed among the woolly herds of plant lice on the stem of an alder near the ground, being completely enveloped in the filaments of the waxy "wool" they might easily have been mistaken for some large Coccinellid. Within a few days they changed to chrysalids of a *Lycænid* type, from which emerged, on the 14th of May following, this rare butterfly.

In this observation is found a probable explanation of Abbott's description of the larva of this butterfly, as given by Mr. Scudder in the CAN. ENT., May, 1872, Vol. IV., p. 85: "Feeds on Indian Arrow-wood and alder; it is partly covered with a white loose down." That the larva

is hairy is almost certain, but what the "white loose down" can be, unless the waxen wool of the plant-louse,* is difficult to determine.

In *Psyche*, Vol. IV., p. 75, August, 1883, Prof. J. A. Lintner records the capture of *F. Tarquinius* on May 25, 1878, by Mr. O. von Meske, and mentions this as indicating *two* broods of this species, the second appearing in August. My rearing the butterfly proves this to be the case, and shows that the insect hibernates in the chrysalis. The tropical butterfly, *Characias*, has, I believe, been found to be carnivorous.

W. HAMPTON PATTON, Hartford, Conn.

A CORRECTION.

The larvæ described by me in Vol. VI., page 209, of *Entomologica Americana*, are *Heterocampa biundata* Walk. and not *Heterocampa subrotata* Harvey as there designated. I have discovered this error on a recent visit to Dr. Packard, where I had the opportunity of comparing the moths with a specimen that Dr. Packard had compared with Walker's types in the British Museum. I was unable to get this correction into *Ent. Amer.*, as the publication of that periodical has ceased.

HARRISON G. DYAR.

BOOK NOTICE.

BIBLIOGRAPHICAL CATALOGUE OF THE DESCRIBED TRANSFORMATIONS OF NORTH AMERICAN LEPIDOPTERA; being Bulletin No. 35 of the United States National Museum, by Henry Edwards, 1889.

This work, issued by the Smithsonian Institution, is one of very great value to the working lepidopterists of North America, and truly supplies a long felt want. Mr. Edwards, who has devoted so much time to the compilation of this work, is entitled to the warmest gratitude of his brother entomologists for his public-spirited labours in this connection. The work extends to 147 pages octavo, and comprises a table of the number of species in each family, of which descriptions of earlier stages are recorded in this catalogue, a list of the principal authors and publications quoted, the body of the catalogue extending from page 9 to page 137 inclusive; an appendix giving references to a few species which are not distinguishable by modern authors, and a list of some of the most valuable papers which have been published on this continent on the

**Pemphigus tessellatus* (Fitch).

P. tessellata Osborn, *CAN. ENT.*, XIV., 61, (Apr., 1882).

? *P. alni* Provancher, *Nat. Can.*, Apr., 1890.

subject of preparatory stages, food plants, rearing and describing larvæ, etc., etc. Then follows an index to genera, and the work ends with a most useful food habit index. The general plan of the work is to give the names of all species of which any of the preparatory stages have been described, followed by the references to these descriptions in the order in which they were published, the dates of publication being given. Upon turning to any species one can thus see at a glance just what of its earlier stages have been described, and by looking up the references can tell whether or not they could be supplemented with advantage, while the absence of any species from the list is a very sure indication that its preparatory stages are wholly undescribed. One can thus see just what has already been done and what remains for investigation, and this is most important, for it is undoubtedly the case that many observations of interest and value are made every year without being published, chiefly, perhaps, because those who make them are unaware that they have not previously been given to the world. The amount of literature examined in the preparation of this work was very great, and the care necessary to avoid errors and omissions proportionate. The table on page 7 shows that some part of the earlier stages of 1069 butterflies and moths have been described, but many of these descriptions are very incomplete, and we can thus see how much still remains to be done in working out these life histories. Of course in a work of this kind, where the field was so large, it was inevitable that some mistakes and omissions should occur, but it is most creditable to Mr. Edwards that they should be so few and so unimportant. It was unfortunate that the printing had to be done during the absence of Mr. Edwards in Australia, as otherwise most of the typographical errors would unquestionably have been detected and corrected. It is, however, a mistake to refer to author's separates, instead of to the work in which the description originally appeared, as for example in regard to the larva of *Chionobas Macounii*—the reference given is "J. Fletcher, a trip to Nepigon, p. 12," whereas it ought to be, "J. Fletcher, Rep. Ent. Soc. Ont., 1888, p. 85." It is greatly to be hoped that Mr. Edwards will be able to fulfil his promise to issue yearly supplements, in order that the work may be kept up to date and its usefulness be thus maintained. The price of this work was fifty cents, but the first edition has already been exhausted. It is greatly to be hoped that a new edition will soon be issued, as no working lepidopterist can get on without it.

H. H. LYMAN.

Mailed March 3rd.

—
e,
k
n
y
ne
re
y
ve
ot
y
es
en
or
ie
se
en
on
d
of
ut
w
Of
vi-
st
at.
of
rs
r.
ne
of
to
t.,
to
y
of
d.
no